

**Acids, bases and salts**

1 Acids react with alkalis to form salts and water.

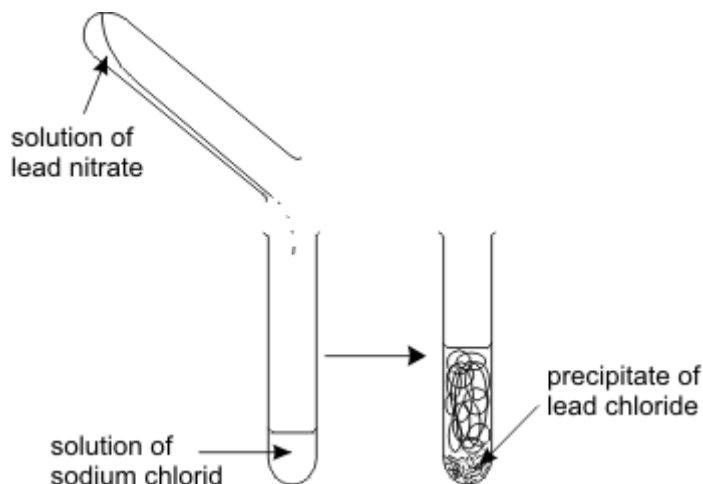
Complete the table below by writing in the name and formula of the salt formed in each reaction.

The first one has been done for you.

Acid	Alkali	Salt	Formula of salt
Hydrochloric acid	Sodium hydroxide	Sodium chloride	NaCl
Nitric acid	Sodium hydroxide		
Sulphuric acid	Potassium hydroxide		

(Total 4 marks)

2 When a solution of lead nitrate is added to a solution of sodium chloride, a white precipitate of lead chloride is produced.

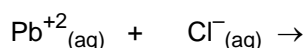


(a) (i) Why is a precipitate formed?

.....  
 .....

(1)

(ii) Complete and balance the equation for this precipitation reaction.



(3)

- (b) Complete the table below by writing in the name and formula of the precipitate formed for each reaction. If there is no precipitate, write "no precipitate".

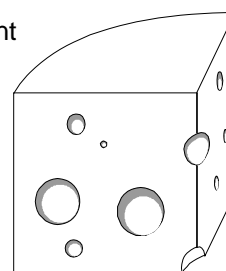
SOLUTION 1	ADDED TO	SOLUTION 2	NAME OF PRECIPITATE FORMED	FORMULA
(i) copper sulphate	—————→	Sodium hydroxide		
(ii) lead nitrate	—————→	Magnesium sulphate		
(iii) sodium chloride	—————→	Zinc nitrate		

(5)

(Total 9 marks)

3. The salt sodium hydrogen phosphate ( $\text{Na}_2\text{HPO}_4$ ) is used as a softening agent in processed cheese.

It can be made by reacting phosphoric acid ( $\text{H}_3\text{PO}_4$ ) with an alkali.



- (a) Complete the name of an alkali that could react with phosphoric acid to make sodium hydrogen phosphate.

..... hydroxide

(1)

- (b) What is the name given to a reaction in which an acid reacts with an alkali to make a salt?

.....

(1)

- (c) How would the pH change when alkali is added to the phosphoric acid solution?

.....

(1)

- (d) What ions are present when any acid is dissolved in water?

.....

(1)

- (e) What ions are present when any alkali is dissolved in water?

.....

(1)

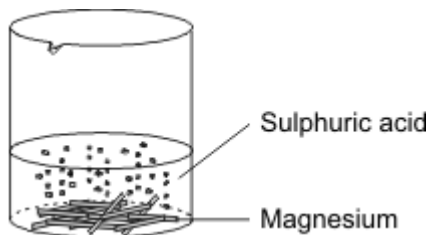
- (f) Write a chemical equation for the reaction which takes place between the ions you have named in (e) and (f).

.....

(1)

(Total 6 marks)

4. A student tried to make some magnesium sulphate. Excess magnesium was added to dilute sulphuric acid. During this reaction fizzing was observed due to the production of a gas.



- (i) Complete and balance the chemical equation for this reaction.



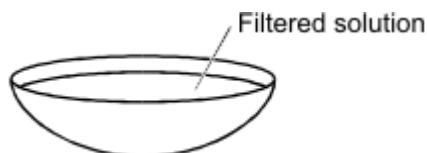
(3)

- (ii) At the end of the reaction the solution remaining was filtered. Why was the solution filtered?

.....

(1)

- (iii) The filtered solution was left in a warm place.



Explain why the filtered solution was left in a warm place.

.....  
 .....

(2)

(Total 6 marks)

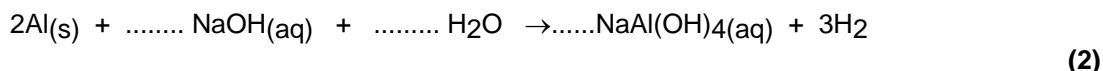
5. Explain, in terms of ions and molecules, what happens when any acid reacts with any alkali.

.....  
 .....  
 .....  
 .....  
 .....

(Total 3 marks)

6. Some drain cleaners contain a mixture of sodium hydroxide and powdered aluminium. When the mixture is poured into a drain it mixes with water and a chemical reaction takes place. The heat from the reaction helps to melt grease in the drain. Hydrogen gas is produced which stirs up the particles and helps to unclog the drain.

(a) Balance the equation for the reaction.



(b) Why do the solid sodium hydroxide and aluminium powder **not** react when stored in a sealed container?

..... (1)

(c) Sodium hydroxide is a strong alkali and would react with any acids in the drain.

(i) Name the ion produced when any alkali is dissolved in water.

..... (1)

(ii) Name the ion produced when any acid is dissolved in water.

..... (1)

(iii) Name the compound formed when these ions react with each other.

..... (1)

(Total 6 marks)